

Exploring the Causes and Effects of Inter-Agency Information Sharing Systems Adoption in the Anti/Counter-Terrorism and Disaster Management Domains

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ABSTRACT

The present paper presents a study that seeks the antecedents of inter-agency information sharing systems adoption and the effects of using such systems on the information sharing practice among anti/counter-terrorism and disaster management agencies. Based on traditional IT acceptance theory, social exchange theory, and distributional justice perspective, the study presents a set of potential determinants of inter-agency information sharing systems adoption and propositions about post-adoption behaviors of user agencies. Also presented in this paper are the results from a preliminary study that administered a survey questionnaire to emergency responders such as law enforcement personnel, intelligence agents, firefighters, emergency medical staffs, and other government employees in the emergency management area. In the preliminary study, the relationships between inter-agency information sharing and hypothesized antecedents including perceived benefits, information assurance, organizational norm, and IT infrastructure are examined.

The results from the preliminary study revealed that the current inter-agency information sharing systems use does not reflect social and operational environments of emergency management organizations. While technical environments such as other agencies' information assurance level and technical standards seem to encourage information sharing systems use, other factors such as perceived task support benefits, organizational norms, and institutional pressure to share information have no or negligible association with the systems use. The paper discusses about the findings and proposes a refined framework and model to understand inter-agency information sharing systems adoption and use.

Categories and Subject Descriptors

H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces - *Asynchronous interaction, Collaborative computing, Computer-supported cooperative work, Evaluation/methodology, Organizational design, Synchronous interaction, Theory and models, Web-based interaction*

General Terms

Security, Standardization, Economics, Management, Theory

Keywords

Information Sharing; Inter-organizational Systems; Anti/Counter-Terrorism; Disaster Management.

1. INTRODUCTION

Many US citizens and residents have been disappointed by the less-than-ideal performance of US anti/counter-terrorism (ACT) and disaster management (DM) agencies through the major disasters that devastated the US homeland in the past several years. While inter-agency information sharing and coordination have been identified as a point of major failure since the 9/11 attacks in 2001 [6, 25], the US government's response to hurricane Katrina in 2005 revealed that the US e-Government initiatives for emergency management agencies still need to improve their information sharing and coordination mechanisms.

The US government has been pushing e-Government for higher efficiency and performance of government operations [28, 29]. Considering one of the strengths of improved information systems is improved coordination power, it would be natural to wonder why ACT and DM agencies have not reaped the benefit of information systems that have been suggested or implemented for better information sharing and coordination [17].

Inter-organization systems (IOS) have long been studied in the MIS discipline [26]. However, previous studies focus on private sector organizations, especially within a supply chain and cannot be readily applied to the ACT context. Widely adopted base theories in the traditional IOS research include Transaction Cost Economics (TCE), resource dependency theory, and coordination theory, which explain inter-organizational coordination and IOS investment as a result of cost minimization, risk reduction, and/or relationship management strategies [7, 9, 15, 39, 42].

Unlike private sector organizations, government organizations share information to generate public goods (i.e., public safety, national security) rather than to maximize the profit of an individual organization [30]. Also, information sharing and IOS development are often planned and executed by an e-Government initiative rather than strategically negotiated between business partners. Therefore, the conditions for and consequences of IOS adoption in the public sector should be re-modeled and examined.

This study analyzes ACT and DM organizations' acceptance of inter-agency information sharing systems in terms of socio-technical factors, such as information assurance of other organizations, sensitivity of information, organizational norm of inter-agency information sharing, and IT infrastructure, at a station level. A station, in this study, refers to any form of physical establishment of an ACT and DM organization located in a small geographic area (e.g., branch office, outpost, chapter, center). Station is expected to share uniform organizational norms, information security needs, and IT environments. By having a station as the unit of analysis, we can use aggregated data collected at the individual level, if multiple responses are collected from the same station, yet assure independency of station level data.

2. THEORETICAL FOUNDATION

Private sector IOS studies have emphasized the economic benefits coming from information sharing among business partners [27, 32, 34, 38, 40] and identified appropriate IOS choices for relationship conditions [12]. While mainstream IOS research approach treats IOS as an enabler of new inter-organizational forms and higher levels of performance, it is equally possible that existing social structure and environment affect development and utilization of IOS, especially in public organizations. Davies and Mitchell [16], based on a postmodernism view of power, politics and knowledge, argued that IT can be utilized in political maneuvering, and an existing power structure in organizations can determine the final manifestation of information systems. US ACT and DM organizations, although all of them would highly value public safety and national security, are assigned to different roles such as intelligence gathering overseas, terrorism investigation in the US homeland, public control and assistance, etc. Because of the different roles, inter-organizational relationships among various ACT and DM organizations are not necessarily always cooperative [34], and they may compete with each other for political power, budget, or just for pride. A national e-government initiative may implement information sharing systems for competing ACT and DM organizations, but the way the systems are implemented and utilized may reflect the competitive relationship as Davies and Mitchell suggested.

Following the duality view of IT, this study makes a conceptual distinction between adoption and post-adoption stages of information sharing information systems. In the adoption stage, environmental factors such as organizational tasks, culture and history, technical and institutional infrastructure, and external ACT and DM agencies will affect the implementation and use of inter-agency information sharing systems. On the other hand, the way that inter-agency information sharing systems are implemented and used will influence the inter-organizational information sharing practice in general once the systems are adopted.

2.1 Adoption stage

The 9/11 in 2001 and hurricane Katrina in 2005 have had a strong enough impact on many US emergency communities to realize the needs to break their organizational boundary and share information with others in the communities. As a consequence, many ACT and DM organizations started to establish cooperative inter-organizational networks, both in a traditional manner and using information technologies [22]. As seen in many private

industries, inter-organizational information systems, such as ASAP, ECONOMOST, SABRE, and proprietary EDIs and electronic market systems in the automobile industry, have become critical competitive advantage or competitive necessity. Although US ACT organizations may not compete with each other, especially after the 9/11, they need to adopt inter-agency information systems in order to achieve a higher performance to compete with their adversaries (i.e., terrorist groups). US DM organizations also need to develop information sharing networks to deliver an acceptable level of protection against the vicious side of Mother Nature, as well as man-made disasters like a terrorist attack.

An important condition for cooperation (e.g., information sharing) is organizational norms for information sharing behavior [18, 35]. Organizational culture such as in-group favoritism [46] plays important role when organizational members determine how much information they should give to their partners. Subjective organizational norm has also been intensively studied and proved to be an important determinant of information systems acceptance behavior [2, 44]. Griffith et al. found that a business partner's commitment to an inter-organizational relationship can elicit a social norm, which will result in increased information exchange between the two parties. [21]. Considering the importance of non-financial, socio-emotional value of exchange outcomes in Social exchange theory (SET), the norms for inter-organizational information sharing within an organization will be a useful index of the overall evaluation of past inter-organizational relationships and will stimulate the practice of inter-organizational information sharing, whether it is done manually or through information systems. Therefore, we hypothesize that subjective organizational norm of inter-agency information sharing positively influences information sharing systems acceptance of emergency management organization, and mediates the positive effect of perceived task-support benefit of information sharing and the negative effect of information sensitivity on information sharing systems acceptance. These hypotheses are denoted as H1, H1a, and H1b in Figure 1.

Gassenheimer et al. [19] adopted a social exchange and distributive justice perspective, in addition to transaction cost analysis approach, to embrace the role of non-financial value and perceived fairness of contributions in inter-organizational relationship development. SET argues that a quality relationship evolves between exchange partners who conform to reciprocal rules and norms of exchange [14]. Organizational norms of voluntary cooperation can emerge from constant evaluation of private and collective goods [24]. In the ACT and DM information sharing context, task support benefits and risk of sensitive information disclosure from information sharing must be assessed in the light of the reciprocity principal. When an organization provides its proprietary information to other organizations, the behavior should be compensated by other organizations' private information of equivalent value or ACT/DM activities that supplement or complement the information provider's operations. However, because of the classified nature of ACT operations, providing private information to another party can seriously jeopardize the information provider's future ACT performance. This risk increases as the sensitivity of information increases, especially when the perceived level of information assurance of the receiving party is low. That is, if an agency handles very sensitive

information, of which disclosure to an adversary can undermine its chance to successfully protect the public and national security, the organization will require its information sharing partners to prove a high level of information assurance capability before it provides sensitive information. The study, therefore, hypothesizes that high information sensitivity hinders information sharing and information sharing systems acceptance and that perceived information assurance level of other information sharing partners has a moderating effect on the negative relationship. H2 and H2a in Figure 1 denote these negative and moderating effects.

In addition to the subjective norm and risk of sensitive information sharing, the existing IT infrastructure and utilization within an organizational boundary can also influence information sharing systems adoption and use. Costs of systems integration and ease of use have been found to be an important determinant of IOS and organizational IT adoption and use [1, 13, 31, 43]. Unless an organization already has internal information systems where its staff stores organizational information and knowledge, making its information available on information sharing systems for other agencies will cause a prohibitive cost. A recent study provides evidence that back-end integration capability is one of the most critical determinants of e-business value [47]. Accordingly, it is expected that an ACT organization that has internal information systems widely used by its staff and easily integrated into information sharing systems will more readily accept and utilize information sharing systems. H3 and H4 in Figure 1 represent these hypotheses.

H1 through H4 assume autonomy of ACT and DM organizations in their information sharing practice. That is, a station has the right to decide on the level of inter-organizational information sharing as well as information sharing systems adoption and utilization. However, information sharing among government organizations, especially ACT domain, is often controlled or, at least influenced, by a supervisory authority or regulations (e.g., OMB, DHS, US PATRIOT Act, Homeland Security Information Sharing Act). Even if an ACT or DM station can decide the usage of information sharing systems, the systems will need to be interoperable with many different technological platforms of a potentially large number of information sharing partners [6]. Therefore, inter-agency information sharing systems adoption requires a mutual agreement of all participating agencies over the IT procedure and process [23]. We thus hypothesize that institutional pressure of information sharing (H5) and availability of information sharing technology standards (H6) may override the station level drives (H1-H4). Based on the aforementioned arguments, the study developed a model of Inter-agency information sharing systems adoption (Figure 1).

2.2 Post-Adoption Stage

US ACT and DM organizations have increasingly developed or tried to develop inter-agency collaboration mechanisms in the recent years. Some have been successful, but some were not. For example, the Joint Regional Intelligence Center (JRIC) has been successful to bring many law enforcement agencies at local, regional, federal, and even international level together and improve inter-agency information sharing, while some others such as the Homeland Security Information Network (HSIN) and the Multistate Anti-Terrorism Information Exchange (Matrix) were dropped by some member agencies or shutdown [6]. Given inter-

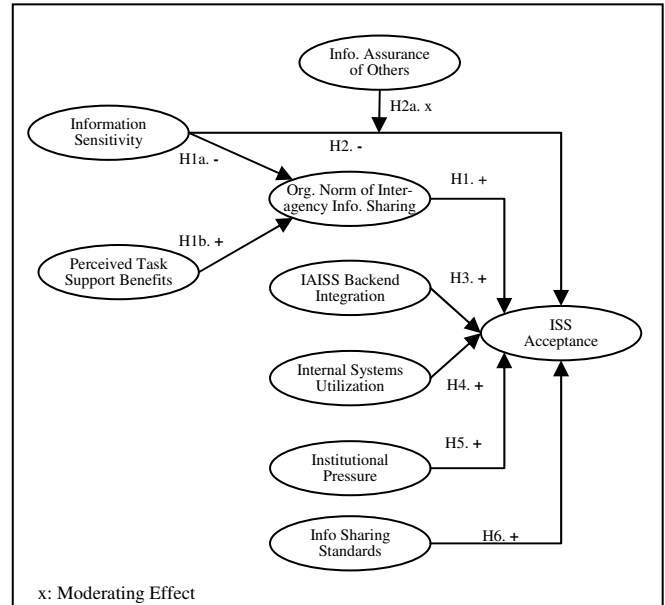


Figure 1. IAISS Adoption Model

agency information sharing systems are adopted by an ACT or DM community, the newly adopted information systems are, in turn, expected to influence the information sharing practice among the community members as well as the effects of the causal factors that had resulted in the previous level and mode of the organizational practice [4, 36]. H1, H1a, H1b, H2, and H3 in Figure 2 represent the causal structure of inter-organizational information sharing, and H2a, H2b, H3a, H3b, and H4 in Figure 2 depict the influence of the adopted information sharing systems on the existing organizational dynamics.

Information systems security has received enormous interest in the recent years as more individuals and organizations increasingly utilize information systems to handle very sensitive information and mission critical operations [37]. Nevertheless, information systems still offer powerful and convenient ways to control a large number of information users and their access to a huge amount of data, which would not be possible without information systems. Previous studies in the e-Commerce and e-Government fields suggests that individuals' perception of structural assurance concepts (e.g., 3rd-party seals, Internet security, technical safeguards) can alleviate assessed risks involved in online interactions, which in turn encourage the individuals to provide sensitive information and commit risky transactions [20, 28, 33]. Accordingly, if newly adopted inter-agency information sharing systems bring a sense of higher level of information security than their counterparts in the previous information sharing practice, the negative effects of information sensitivity on the norms and actual practice of information sharing can be attenuated (H2a and H2b in Figure 2).

Inter-agency information sharing systems involve various ACT and DM organizations, some of which might have initiated the project to achieve their organizational goals while some others might be brought in by a higher authority or a social pressure. Consequently, the impact of such information sharing systems on participating agencies will differ from agency to another, depending on the goals and roles of the various agencies. When

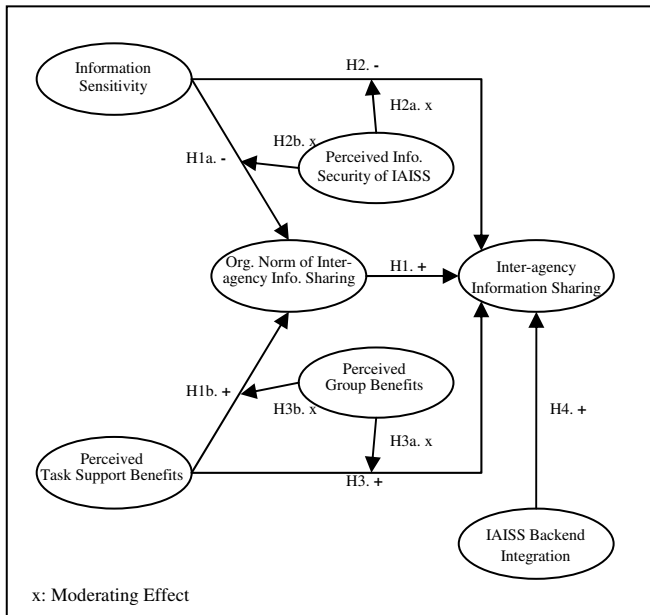


Figure 2. IAISS Effects on Inter-Agency Information Sharing

inter-agency information systems are mainly designed to support a certain organization's tasks (e.g., Terrorism investigation for FBI), it is important for the systems and the main beneficiary to also provide some group benefits for others in the group (e.g., national security, public safety, feeling of membership, pride/social recognition). Gassenheimer et al., based on transactional cost economics, social exchange, and distributive justice, suggested a framework for combining relational forces that guides or predicts relationship retention decision in an existing inter-organizational relationship [19]. According to their framework, organizations participating in an inter-organizational relationship maintain the relationship as far as the value from the relationship is distributed fairly, and the perception of fairness of an exchange relationship is determined by equity, equality, and group needs rules depending on the participating parties' intentions. Although their study assumed general business relationships, some of their proposition can be applied to the public sector to predict inter-agency information sharing systems users' post-adoption behaviors. One of their propositions says that "under relational patterns that vary between parties because of differences in economic value, ... The relationship will be maintained as long as the distribution of value is based on group needs ..." [19 p.333]. Because the term "economic value" in the proposition reflects organizational performance in the private sector, we can replace the term with "task supports" or "agency achievements." That is, if inter-agency information sharing systems help a certain agency (e.g., FBI) achieve its objectives (e.g., Terrorism prevention or investigation) more than the other participating agencies (e.g., local police whose primary role is to protect local people), the chief performance beneficiary must fulfill group needs (e.g., public safety, national security, and social recognition of the local police's contributions) to keep the other parties support the systems. Based on the same logic, we can predict that ACT inter-agency information sharing systems designed to maximize intelligence gathering and streamline bottom-up information flow for centralized information analysis need to compensate the contributing agencies by satisfying their

group needs. On the other hand, if DM agencies adopted inter-agency information sharing systems to protect people in their jurisdictions from random, natural disasters, information will flow in all directions and task support benefits will be distributed, on average, equally among the participating DM agencies. This approach offers an analytical structure to ROI perspective of inter-agency collaboration and information sharing. In order to make inter-agency collaboration and information sharing systems work, the system should be able to provide acceptable Return on Investment (ROI) to the participating ACT and DM agencies. This requires acceptable roles and conditions for systems use, clear specification of shared and not shared information, and articulation of the ultimate objectives of the systems [34]. Assuming that inter-agency information sharing systems for ACT are more asymmetrical, or unfair, in terms of the distribution of information contribution and task support benefits (i.e., performance gain) than those for DM communities, the aforementioned discussions suggest that following hypotheses:

The positive effect of Perceived Task Support Benefits on Inter-Organizational Information Sharing (H3 in Figure 2) and Organizational Norms of Inter-Agency Information Sharing (H1b in Figure 2) are moderated by Perceived Group Benefits (H3a & H3b respectively).

Another important factor of inter-agency information sharing systems that will determine whether the community can reap the benefits of the information systems or not is back-end integration. The resource-based view (RBV) suggests that, in order for an organization to create a strategic value from IT, the organization must be able to leverage its IT skills, knowledge, and resource in a way that others cannot easily imitate or acquire [5, 41]. Previous research in e-business area has found that IT integration can create business value, because IT integration involves a complex and imperfectly understood process of combining individual IT components to develop a coherent infrastructure that fulfills the focal organization's needs [8, 45, 47]. E-business studies found both, front-end and back-end integrations create business values. However, in this study context, the only point of IT integration, and thus the only concern, is the back-end of an organization where internal information systems interface with inter-agency information sharing systems. Obviously, when internal information systems are tightly integrated into inter-agency information sharing systems, the information resides on the internal systems will be streamlined to other organizations on the inter-agency information sharing systems, greatly improving inter-organizational information sharing in general (H4 in Figure 2). The following section describes a preliminary study conducted to refine the above mentioned models.

3. PRELIMINARY RESEARCH

The authors conducted a preliminary research in a small scale in order to 1) validate the suggested determinants of inter-agency information sharing systems adoption and 2) examine the impacts of inter-agency information sharing systems adoption on overall information sharing practice among the adopter agencies.

3.1 Research Design and Methodology

For the preliminary study, an online survey questionnaire was administered to emergency responders in 2006. A request for survey participation was sent to online newsletter subscribers of

Terrorism Research Center Inc. (TRC), a research partner that has public websites with 5-million hits per month (www.homelandsecurity.com & www.terrorism.com). The survey participants who were not in the ACT and DM domain were filtered out and redirect to a different web site.

The questionnaire includes multiple measurement items (Table 1) with Likert-like agree-disagree scales for core constructs in the model, as well as other questions for respondent categorization. Collected data were analyzed using SPSS and PLS. The unit of analysis is a station, which means that responses from the same emergency management organization within the same geographic area are averaged. This grouping process insures independence of station-level data and increases the reliability of the data being analyzed.

Table 1. Measurement Items

1. Information Sharing Systems (ISS) Adoption
My station has information systems that allow other ACT organizations to freely share necessary ACT information.
Every ACT organization that needs to share information with us has access to my station's information systems.
All ACT information that my station has is available on information systems through which other ACT organizations can access the information.
11. Inter-Agency Information Sharing
My station allows other ACT organizations to freely share its ACT information.
My station does not hold back its proprietary ACT information from other ACT organizations.
If requested, my station will provide its proprietary ACT information to any ACT organization.
2. Perceived Information Assurance of Others
The staff in my station are more capable of securing information systems than other ACT organizations that may want to share information with us.
If my station shares sensitive information with other ACT organizations, the information may leak to an unauthorized user.*
Some ACT organizations do not care about information systems security as much as my station does.
3. Organizational Norm of Inter-agency Information Sharing
The head of my station strongly encourages all staff in the station to share ACT information with other ACT organizations.
My supervisor encourages me to share all ACT information that I have with other ACT organizations.
If I share my ACT information with other ACT organizations, the behavior will be seen positively in my station.
4. Information Sensitivity
Some of the ACT information that my station has requires extreme security, even within my organization.*
Public safety can be undermined if my station shares all the ACT information that it has with other ACT organizations.
National security can be undermined if my station shares all the ACT information that it has with other ACT organizations.
5. Perceived Task Support Benefits
It is critical for the staff in my station to have access to other ACT organizations' information in order to successfully perform its ACT roles.
My station can benefit from sharing its information with other ACT organizations.
The ACT information that my station gives to other ACT organizations is usually more valuable than the information that my station receives from other ACT organizations.*
6. Internal-IAISS Backend Integration
All ACT information that I store in my station's information systems can easily be made available to other ACT organizations.*

It takes extra efforts to allow another ACT organization to share the ACT information in my station's internal information systems.
The information flow from my station's internal information systems to other ACT organizations is streamlined.**
7. Internal Systems Utilization
All the knowledge that my station's staff have is stored in my station's organizational information systems.
All the ACT information that my station gathers is stored in my station's internal information systems.
Every employee in my station uses organizational information systems to share information with other employees in the station.*
8. Institutional Pressure of Information Sharing
My station has been mandated by a law/regulation to share all ACT information with other ACT organizations.
A higher authority has encouraged my station to share all ACT information with other ACT organizations.
There are some legal issues that prohibit my station from sharing its information with other ACT organizations.*
9. Information Sharing Standards
There is an established information systems development standard for easy information sharing among ACT organizations.
There is a standard data format for all ACT organizations.
Every ACT organization that shares information with my organization uses the same information systems as what my station uses.*

* Dropped item

3.2 Data Analysis

The collected data from the preliminary study were analyzed with an exploratory data analysis approach. The survey yielded 28 completed responses from members of various ACT and DM communities (Table 2), and after data cleaning, 25 cases from 25 different stations were used in the following data analyses. Due to the exploratory nature of the research objectives and limited number of usable responses, statistical significances of the causal relationships in the structural models (Figure 1 and Figure 2) were not tested. Instead, we ran several statistical tests in order to conservatively assess the soundness of the suggested model.

First, the internal consistency of measurement items for each latent variable was tested using SPSS (Cronbach's Alpha). For each construct of which reliability was lower than 0.7, we dropped one indicator with the lowest factor loading calculated by PLS. Asterisk marks in Table 1 indicate the dropped measurement items. In the subsequent PLS measurement model test, all factor loadings were well over 0.7, except one item for information sharing norm (0.657), which is still acceptable [3, 10]. The lowest composite reliability was .746 and every square root of AVE values is larger than corresponding inter-construct correlation coefficients. However, a cross-loading test revealed that an indicator of back-end Integration and another of Information Sharing Standards were heavily loaded on Information Sharing Systems Adoption. For conservative testing, we dropped those items (marked with two asterisks in Table 1).

We then turned our attention to the inter-construct correlation matrix calculated during the PLS measurement model testing. Because this is an exploratory study of which the primary objectives are to understand the information sharing practice in highly sensitive public service communities, it would be more valuable to learn as much insight as possible from the preliminary data and refine the models before a full-scale study, rather than to test whether all the hypothesized causal links are statistically significant or not. Also, with the small size sample and arduous access to the appropriate survey population, including every

possible antecedents of information sharing system acceptance in the initial model is not practical. For the reasons, we used inter-construct correlation coefficients to filter out some constructs and to identify other additional variables that should be included in a refined model. Once the model is refined, we ran a PLS analysis to get estimated path coefficients. However, we did not test statistical significance of those path coefficients.

The study adopts the PLS product-indicator approach suggested by Chin et al. [11] to test the interaction effect between perceived information assurance (IA) of others and information sensitivity (IS) on information sharing systems acceptance. In the PLS approach, a new variable that represents the interaction-term of two constructs are calculated by multiplying the standardized reflective indicators of the two constructs [11]. For our 2-indicator constructs, the calculation procedure resulted in a 4-indicator interaction-term variable (e.g., IA x IS in Figure A in Appendix).

Table 2. Sample Statistics

ACT Community	# of Cases
Emergency Response Community - Police/Law Enforcement, Firefighter, Emergency Medical Service, etc.	13
Federal Government - Homeland Security Office, Defense/Military, and Intelligence	10
Local/State Homeland Security Office & Other Defense/ Security related Government Agencies	3
All Other Government Agencies & Defense/Security/Emergency Response related Private Contractor firms and Consultants	2

3.3 Results and Discussion

Inter-construct correlation coefficients (Table A in Appendix) revealed many interesting relationships among the constructs in question. Most of all, perceived information assurance of others (construct #2 in Figure A) has a noticeable positive correlation ($r = 0.279$) with information sharing systems adoption (#1). While we hypothesized a moderating effect, but no direct effect, the correlation suggests that a direct effect may exist from this construct. One explanation of this unexpected correlation would be that the nature of the information and jobs handled by ACT and DM organizations require all information not to be disclosed to any other party. This is understandable because virtually every type of information that ACT and DM deal with is sensitive to someone (e.g., medical condition, traffic violation/conviction records, terrorist black-list).

Equally interesting is the positive, not negative, correlation ($r = 0.222$) between information sensitivity (#4) and the dependent variable (#1). This correlation seems real because information sensitivity does have negative correlations with subjective organizational norm of inter-agency information sharing (#3) ($r = -0.414$) and inter-agency information sharing (#11) ($r = -0.141$), a second dependent variable that captures all modes of inter-agency information sharing (e.g., face-to-face, mail, general electronic channels, etc.). Reversed correlations were also found in the organizational norm (#3) and institutional pressure (#8). Neither the norm nor the pressure seem to have a meaningful relationship with ISS Adoption (#1), but they show a very strong positive

correlation ($r = 0.717$ and 0.631 respectively) with inter-agency information sharing (#11). Also, the norm's correlations with information sensitivity (#4) ($r = -0.414$) and perceived task support benefits from information sharing (#5) ($r = 0.452$) are strong and the signs are as expected. These patterns imply that inter-agency information sharing systems might have planned and developed by a centralized authority, rather than naturally emerged. Therefore, the resulting inter-agency information sharing systems are in needs of stronger information security measures and cultural/social supports from member agencies.

Information sharing standards (#9) shows a moderately strong positive relationship ($r = 0.314$), as hypothesized, with ISS Adoption, but other IT environmental factors (i.e., back-end systems integration and internal systems utilization) do not seem to have a measurable relationship with ISS Adoption. The interaction-term variable (IA x IS) didn't show significant relationship with ISS Adoption ($r = -0.016$). However, we cannot dismiss the potential effect of this variable because PLS product-indicator approach requires more reflective indicators or larger sample size to detect an existing interaction effect. The results from the preliminary study are presented in Appendix Figure A. Figure 3 shows a revised model of inter-agency information sharing systems adoption that incorporates the insight from the above discussed preliminary study. The model of IAISS effects does not need revision.

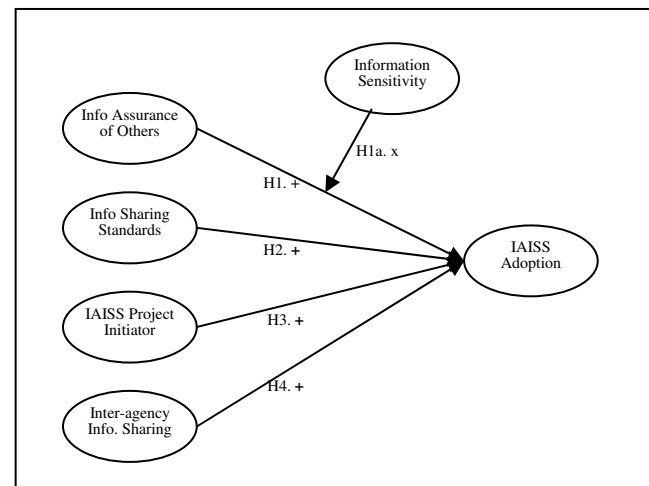


Figure 3. Revised Model of IAISS Adoption

4. FOLLOW-UP RESEARCH PLAN AND CONCLUSION

The models presented and revised in this paper will be tested in a full-scale follow-up survey. The survey will be distributed to ACT and DM organizations through multiple research partners from late 2006 through 2007. The authors are currently arranging multiple survey distribution channels through various organizations including an emergency responder training program office in an author's institution, regional/state level disaster management offices, and networks of local disaster management organizations (e.g., disaster early warning group, local Infragard chapter). The participants will be grouped according to their stations' inter-agency information sharing systems adoption stage (i.e., (pre-) adoption and post-adoption), and each of them will be

asked to answer two sets of equivalent questions, one regarding inter-agency information sharing systems for ACT and the other regarding those for DM. This is based on the assumption that task support/performance benefits from inter-agency information sharing systems for DM organizations are reciprocal and symmetric to all participating agencies, while benefits from inter-agency information sharing systems for ACT organizations are asymmetric and the chief beneficiary need to provide task unrelated or social benefits to other participants.

This ongoing study examines socio-technical factors in order to explain information sharing systems acceptance in the Anti/Counter-Terrorism (ACT) and Disaster Management (DM) domains. Many ACT and DM organizations are governmental or non-governmental public organizations that do not operate to maximize profits. Therefore, previous research of inter-organizational systems, cooperation, and information sharing, conducted mainly in the private sector, cannot be readily applied to the e-Government context, especially when the exchanged information is extremely sensitive.

This paper presented findings from a preliminary survey research and a revised model for our follow up study. In this paper, we focused on correctly interpreting data and providing an insight into the current practice of information sharing systems adoption and utilization among ACT and DM organizations.

Most important finding in this study is the inconsistency between the use of information sharing systems and organizational needs. It is evident that information sharing systems acceptance is mainly influenced by information security concerns and technical facilitating conditions (e.g., standards), rather than the value of information sharing to the organization. We suspect that the centralized planning and control for government organizations might cause this gap. Although inter-agency information sharing systems for emergency management organizations need a strict control in most cases, information systems that do not reflect organizational benefits, norms, and requirements will not be able to unleash the potential performance of the ACT and DM organizations nor the maximum utility of information sharing technologies.

The findings also suggest that a positive direct effect of information sharing partners' information assurance capability on information sharing systems adoption, regardless of the sensitivity of shared information. This result leads us ask about the incentive systems for information sharing in the ACT domain. If there are some kinds of incentives, ACT and DM organizations may not require excessive information assurance for non-sensitive information. Without such an incentive mechanism in the public sector, competence in information assurance will be an operational necessity for all ACT and DM organizations that need to share information with others.

This study offers a valuable foundation for future research in the ACT domain and other emergency management areas by developing and testing measurement items and refining the structural model. The interpretive approach and structured questionnaire survey provides researchers with a much richer and well balanced tools and knowledge for future extension.

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7. APPENDIX

Table A. Inter-construct Correlation Matrix (AVE values in diagonal)

	1	2	3	4	5	6	7	8	9	10	11
1. ISS Adoption	0.693										
2. Info. Assurance	0.279	0.750									
3. Norm of Info. Sharing	-0.034	0.371	0.687								
4. Info Sensitivity	0.222	0.185	-0.414	0.891							
5. Task Support Benefits	-0.434	0.043	0.452	-0.183	0.664						
6. Backend Integration	0.074	-0.330	0.276	-0.427	0.326	1.000					
7. Int. Sys. Utilization	-0.076	0.380	0.242	0.138	0.056	-0.043	0.862				
8. Institutional Press	-0.070	0.429	0.737	-0.320	0.302	-0.052	0.069	0.729			
9. IS Standards	0.314	0.108	-0.199	0.031	-0.285	-0.004	0.274	-0.384	0.624		
10. IA x IS (#2 x #4)	-0.016	-0.160	-0.445	0.160	-0.254	-0.150	-0.278	-0.252	0.128	0.731	
11. I-A Info. Sharing	0.304	0.331	0.717	-0.141	0.441	0.364	0.044	0.631	-0.163	-0.193	0.711

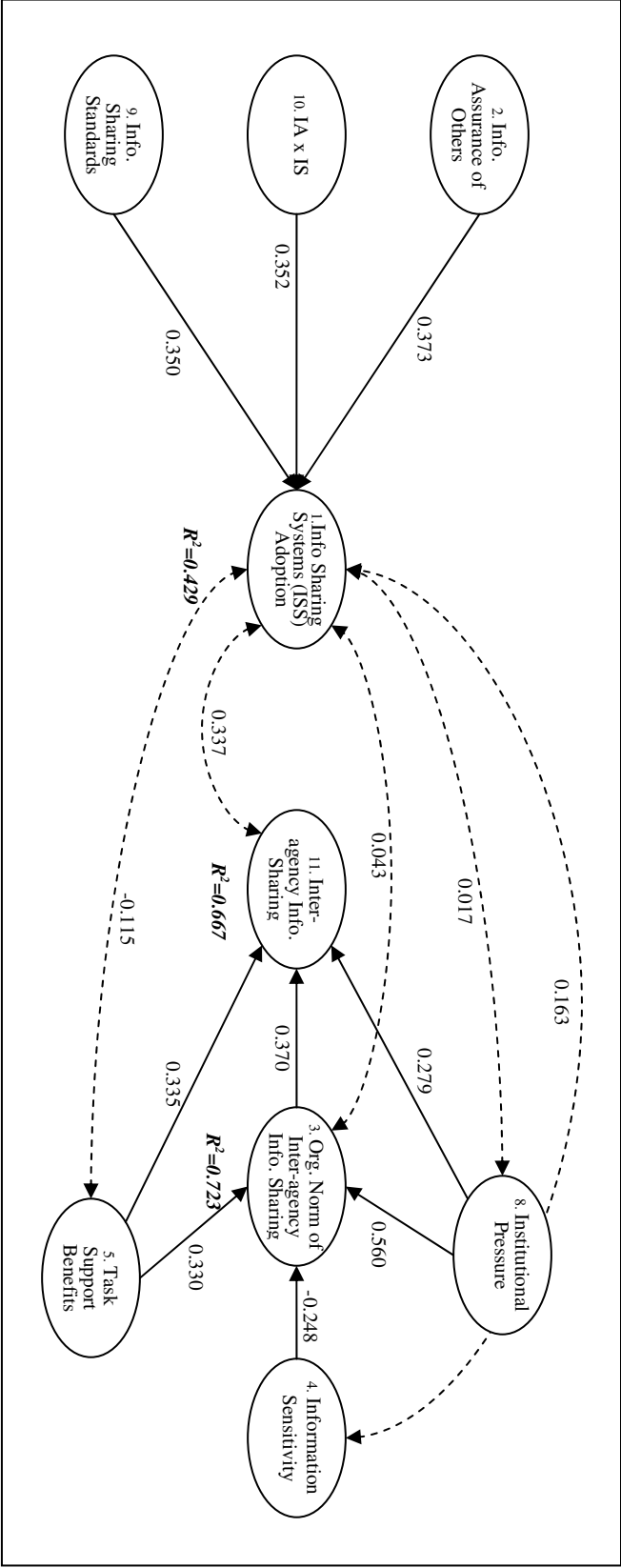


Figure A. PLS Estimates of Extended Structural Model (dotted lines: correlations between construct in the estimated structural model)